FINAL REPORT

ENHANCED DIRECT SEEDING SYSTEMS - ANNUAL LEGUMES FOR FORAGE

19970395

October 2001

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AGRI-FOOD INNOVATION FUND

Canada

Saskatchewan

102-00256/

Agri-Food Innovation Fund
Diversified Farming Systems Program

2001 Final Report

Enhanced Direct Seeding Systems

Summary

With the decline in grain prices and increase in input and transportation costs, many producers are changing their current farming practice to maximize the value of their land base. Seeding grasses and forages to marginal land and diversifying into livestock is one step towards this goal. Other benefits associated with this project include issues such as carbon sequestration, soil conservation and agricultural sustainability. The objective of this test is to ascertain the viability of incorporating an annual legume into a cropping system for grazing or hay production. Secondly, to test the ability of alfalfa to establish itself in a legume cover crop, providing the farmer with a forage crop in the year of establishment. After three years of data, it appears that a pea crop as an annual forage source is a viable choice for producers.

Background

The introduction of a pulse crop into an annual rotation solely for grazing and/or hay production purposes under a direct seeding system is one possible option in a rotational cropping system. This will allow producers to diversify into cattle as markets dictate without taking land out of annual crop production. In the 2000 growing season we again added new treatments to the study. The eight entries included a normal leaved yellow pea (Grande), a semi-leafless yellow pea (Carneval), Fenugreek.(C-quattro), a normal leaved pea (Grande) paired with barley, a normal leaved pea (Grande) paired with a forage oat, alfalfa paired with a semi-leafless pea variety (Carneval), a long vine silage pea (40-10), and a long vine pea (40-10) paired with triticale. The barley, forage oat, and triticale were included to improve the standability of the normal leaved pea and the 40-10 silage pea, while the open canopy of the semi-leafless variety (Carneval) will allow more sunlight exposure to the emerging alfalfa seedlings. The treatments would successfully remove summerfallow or chemical fallow out of the rotation and replace it with a viable economic alternative for producers in the brown soil zone. The pulse crop would provide a low input feed source for diversification into cattle as well as fix nitrogen for subsequent crops.

Underseeding alfalfa in combination with a pulse crop will demonstrate the viability of establishing an alfalfa stand without losing production in the establishment year. Issues that will be looked at include; forage biomass, crude protein in the establishment year and evaluation of establishment success of the alfalfa the following year.

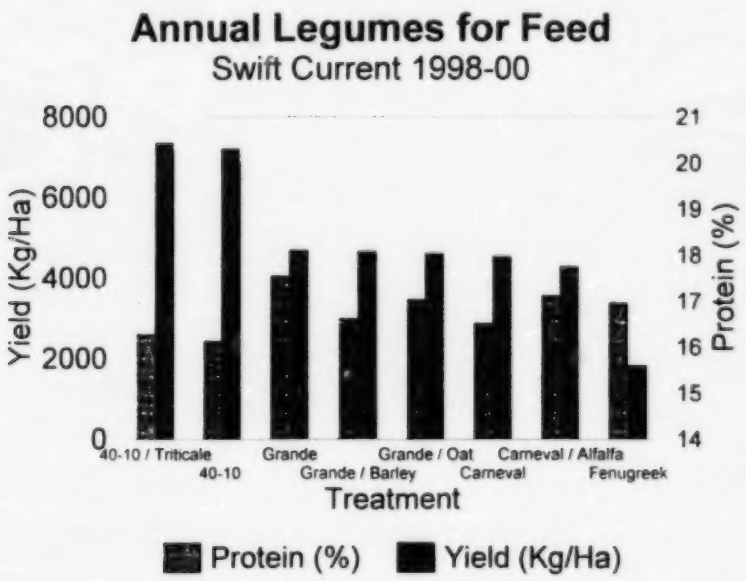
Objectives

To determine the potential of growing an annual legume in rotation for the production of hay and/or grazing in a direct seeding system.

Project Activities

-Located 9 miles east of Swift Current at the Swift Spoke site at Larry and Sandra Hill's farm.
- Preseeding burnoff with 0.5L/ac of glyphosate on May 15th.
-Each years plots were seeded in mid May with a Flexi-Coil 5000 air drill (1720 air tank, 9 inch spacings, stealth knife/sidebanding boots for openers). Each crop was inoculated with the appropriate strain of rhizobium with no fertilizer. Seeding rate were Grande (180 lbs/ac), Carneval (180 lbs/ac), Fenugreek (20 lbs/ac), 40-10 silage pea (160 lbs/ac), Grande/Barley (150 lbs Grandes / 35 lbs Harrington barley), Grande/Oat (150 lbs Grande / 35 lbs Oats), Carneval/Alfalfa (150 lbs Carneval / 5 lbs Rangeland alfalfa), and 40-10 silage pea/Triticale (120 lbs Silage pea / 35 lbs Trititcale).
- collect data: annual legume biomass yield - July, and crude protein levels- December.
- annual summer tour.

Results and Conclusions



Results indicate the introduction of annual crops for forage production may be a viable option for producers looking for feed on a short term basis and a replacement to summerfallow in a cropping system. Average biomass from both the silage pea (40-10) and the silage pea / triticale mix are over 7000 kg/ha (over 3 ton/ac), significantly higher than the remaining treatments.

There was no significant biomass differences among the Grande, Grande/barley, Grande/oat, Carneval, and Carneval/alfalfa with yields ranging from 4286 to 4690 kg/ha (about 2 ton/ac). There were some standability advantages when cereals were included in the mixes in Grande pea and 40-10 silage pea, however, in most years the stand was cut before the crop had a chance to lay down. The fenugreek, with its low growth habit, had significantly lower biomass yields than all other treatments at 1818 kg/ha (0.8 ton/ac).

Proteins in some treatments varied from year to year. In 1999, fenugreek displayed significantly higher protein (19%), however, when looking at the project average proteins moved close to 17%. This variation may be due to the fact that, as far as we know, an adequate strain of inoculant is yet to be developed for fenugreek. Other treatments ranged from 16.1 to 17.1% protein, with the leafier grande treatment being slightly higher at 17.5% protein.

Crop	Yield (Kg/Ha)
40-10 / Triticale	7344a
40-10	7206a
Grande	4690b
Grande / Barley	4656b
Grande / Oat	4602b
Carneval	4532b
Carneval / Alfalfa	4286b
Fenugreek	1818c

Crop	Protein (%)
Grande	17.54a
Carneval / Alfalfa	17.12ab
Grande / Oat	17.03ab
Fenugreek	16.96ab
Grande / Barley	16.61bc
Carneval	16.51bc
40-10 / Triticale	16.28c
40-10	16.12c

The Carneval/alfalfa treatment was included to determine the establishment success of alfalfa when under seeded with peas. This provides a long term forage stand without losing production during the year of establishment. We evaluated the establishment of the alfalfa stand the following year, and even though our evaluation was visual, we consistently observed a high level of success, estimated at over 90%. This study never saw a drought year and it is unknown how this would effect alfalfa establishment. Due to land commitment these alfalfa stands were not taken to yield.

Alfalfa Establishment (year 2)

Further development opportunities

It appears that the silage pea produces much more biomass than the other pea varieties, however some protein is sacrificed. This tradeoff leaves producers with a decision that depends on the individuals feeding program. This study never saw a drought year like we experienced in 2001. It is unknown how this would effect the feasability of annual legumes for feed. Other forage options, such as annual ryegrass, may have a good fit in an annual forage program.

Information Sharing

The sharing of information has been, and continues to be, a major area of focus for the Wheatland Conservation Area. The following are events where information from this project was shared and the approximate number in attendance:

Field Days

Switzerland group June 29 (30)
Alberta Producer Tour July 4 (40)
Wheatland/SPARC field day July 5 (450)
Wiens AgriTech "Producer tour" (50)
Assiniboia field day (40)
Excelsior Crop Club field day (12)
8 Industry tours (Monsanto, Dow, BASF) (100)
8-10 Unstructured tours throughout the summer (25)

Producer meetings and Conferences

Numerous producer meetings were held during the winter. Since we are the only Spoke site covering the brown soil zone, we run meetings in with SSCA and SAF to best serve the entire district. A few conferences and trade shows that showcased this project include the Dryland Crop Rotations Conference in Moose Jaw, the SSCA Conference and the Crop Production Show in Saskatoon.

Other information sharing

Project information will be passed on to Jim Graham (Livestock Agrologist, SAF), and other Extension Agrologists in S.W. Saskatchewan, to be used with their extension activities. A report will also be posted on the Spoke Site web page.